



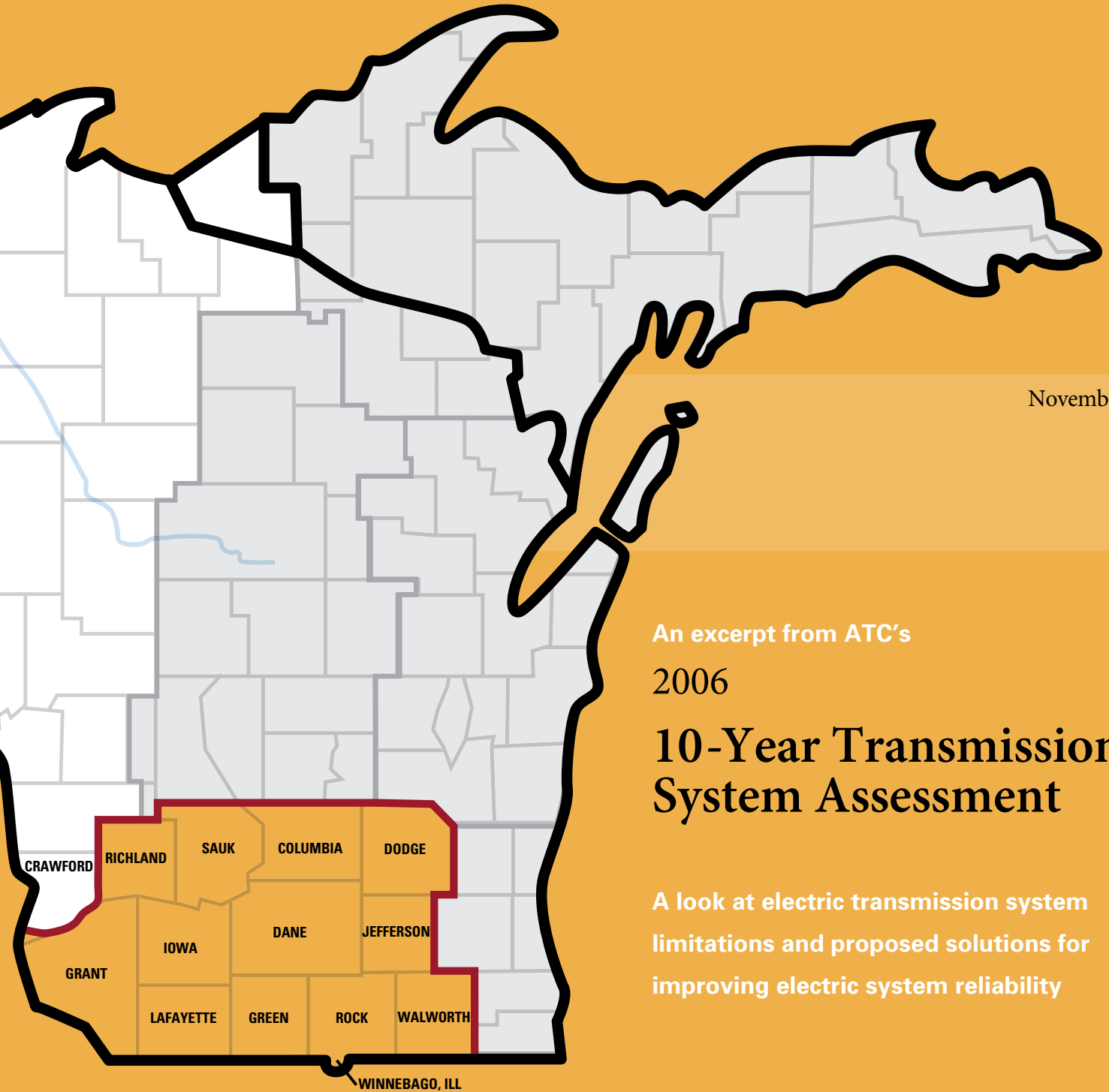
# Zone 3 – South Central/Southwest Wisconsin and North Central Illinois

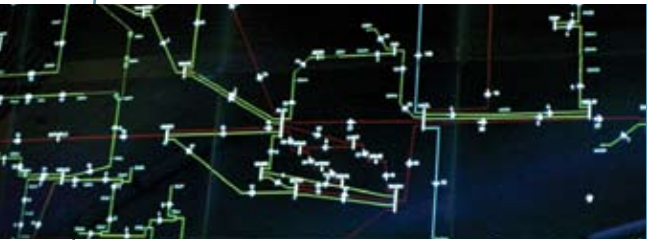
November 2006

An excerpt from ATC's  
2006

## 10-Year Transmission System Assessment

A look at electric transmission system limitations and proposed solutions for improving electric system reliability





## Looking at tomorrow's electric needs today

Advances in technology powered by electricity are improving our quality of life. At the same time, it's created a dependence on and expectation for an uninterrupted supply of electricity. We rarely notice how plugged in we are...unless the lights go out.

At ATC, we are helping to keep the lights on, businesses running and communities strong. However, the age of the electric transmission system and changes in the regional wholesale electricity market are impacting the reliability of the electric system upon which people and businesses have become so dependent.

To address the issues, ATC continually conducts engineering studies on the electric transmission system looking for potential problems that may affect the future performance of the system. As part of our technical studies, we take a comprehensive look at various factors affecting electricity utilization in the region, such as business development, employment trends, population and projected growth in electricity usage.

Our findings are summarized in an annual 10-Year Transmission System Assessment, which identifies and begins to prioritize future projects needed to improve the adequacy and reliability of the electric transmission system. We look 10 years into the future because it can take up to eight years to plan, study route options, get approvals and build new transmission lines.

### **Studies indicate need for \$3.1 billion investment over 10 years**

In our assessment of the electric transmission system needs through 2016, we estimate \$3.1 billion in system improvements including 360 miles of new transmission lines and upgrades to more than 840 miles of existing lines across our service area. Summarized in this booklet are highlights of the electric transmission system issues in South Central/Southwest Wisconsin and North Central Illinois.

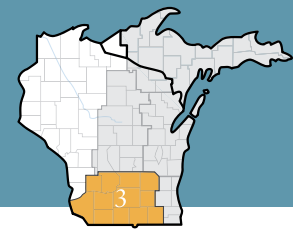
For complete information from our 2006 10-Year Assessment, go to: [www.atc10yearplan.com](http://www.atc10yearplan.com)

### **Transmission is the vital link in bringing power to communities**

Transmission lines move electricity at high voltages over long distances – from power plants to communities where local utilities deliver power to homes and businesses via local electric distribution lines. A reliable transmission network provides access to many sources of power, whether they are local or regional. Having multiple paths to get power from producers to consumers lessens the chance that they will experience service interruptions. Multiple major transmission lines also give power generators and local utilities the flexibility to access regions where they can sell and buy electricity to control overall costs for everyone.



[www.atc10yearplan.com](http://www.atc10yearplan.com)



# Zone 3 – South Central/Southwest Wisconsin and North Central Illinois

## Electric System Overview

### Population, employment increasing

- Population is projected to grow 1 percent annually through 2011. From 2001 to 2006, Dane County realized the largest increase in population, while Walworth County had the highest growth rate.
- Employment is projected to grow 1.7 percent annually through 2011. From 2001 to 2006, Dane County realized the largest increase in employment and the highest growth rate.

### Electricity usage growing

- Electric load is projected to grow approximately 2.9 percent annually through 2015.
- Demand in Dane County is projected to grow at an above-average rate for the ATC system. High demand coupled with generation retirements, concerns about the age and high cost of remaining generators, and stress on the transmission lines that are critical for importing power to Dane County will continue to increase.

### Transmission projects completed or under way address electric needs

- **East Beaver Dam project** – In 2006, we completed construction of 1.5 miles of new 138-kV line to serve a new Alliant Energy substation.
- **Columbia-North Madison project** – In 2005, we completed conversion of this 138-kV line to 345-kV operation.
- **Columbia-Rio project** – In 2006, we began construction of a new nine-mile, 69-kV line from a substation near Columbia Power Plant to a substation near Rio. The line also will connect to a new Alliant Energy substation.
- **Delavan-Darien project** – In 2006, we upgraded the 69-kV line to 138 kV and rerouted the line. We also received approval for a five-mile line connecting to new Alliant Energy substations.
- **Jefferson County project** – The PSC approved 17 miles of new 138-kV lines and upgrades to several substations.

Our 2006 10-Year Transmission System Assessment outlines more than 70 projects to ensure electric system reliability in South Central / Southwest Wisconsin and North Central Illinois. These projects are in various stages of development. The following pages describe the system limitations in South Central / Southwest Wisconsin and North Central Illinois and our planned, proposed and provisional projects to address those limitations.

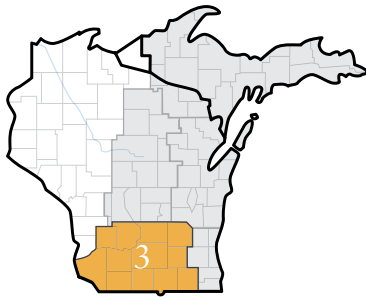
# Zone 3 – South Central/Southwest Wisconsin and

## Transmission system characteristics in Zone 3

ATC delivers power in Zone 3 with various transmission facilities including:

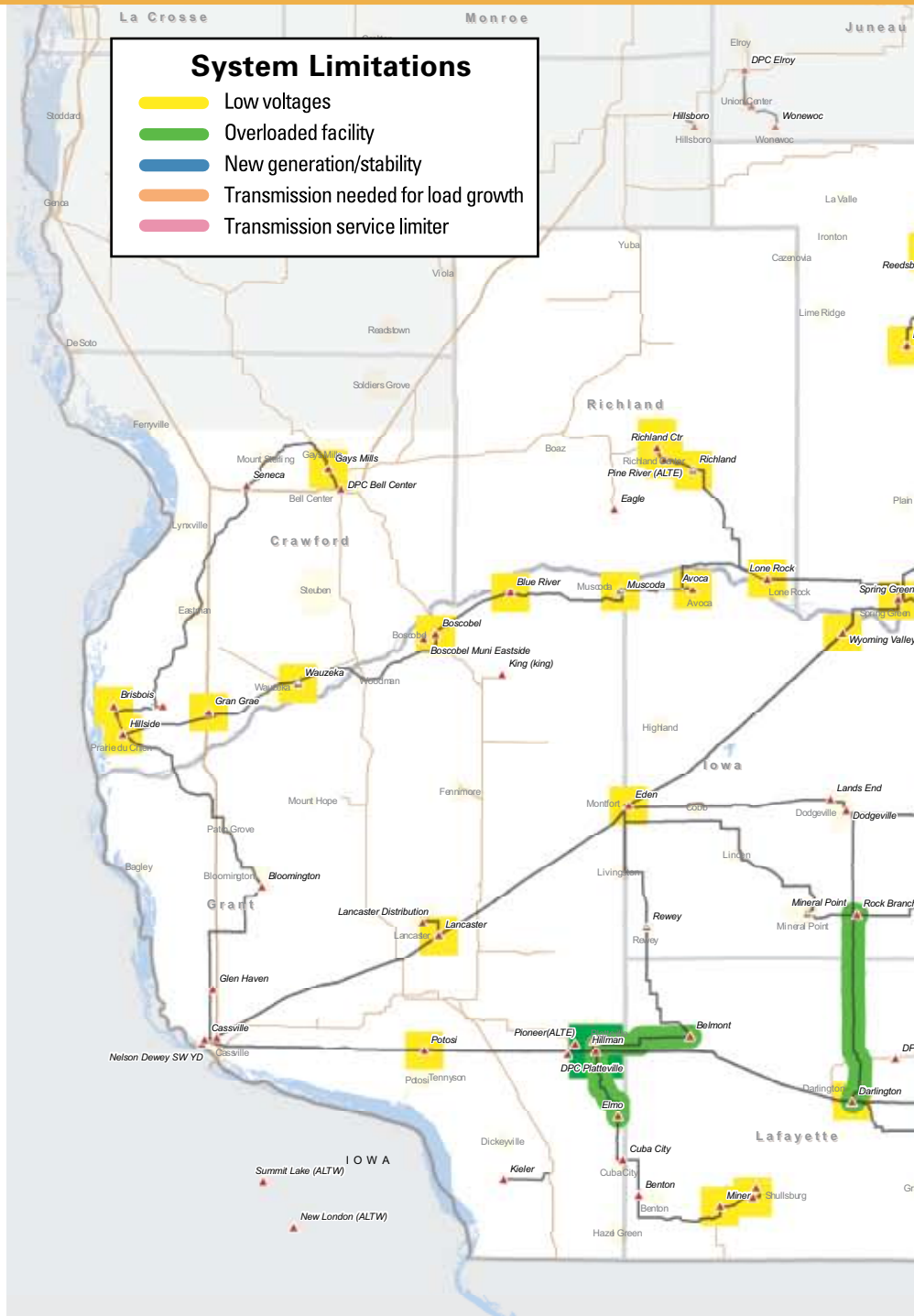
- a north-south 345-kV line from Illinois extending to Columbia Power Plant
- a north-south 345-kV line from Illinois extending to Paddock Substation
- an east-west 345-kV line from Fond du Lac to Columbia Power Plant and
- 138-kV and 69-kV facilities throughout the remainder of the zone.

There are a number of transmission system performance issues in Zone 3 including voltage instability, generator instability, limited import capability, chronic transmission service limitations, overloaded lines and equipment, and low system voltages throughout the zone. The causes of these emerging problems include steady or rapid growth in certain areas, two new power plants and parallel path flows from new generation in northern Illinois.



### Zone 3 includes the counties of:

- Columbia
- Crawford (southern portion)
- Dane
- Dodge
- Grant
- Green
- Iowa
- Lafayette
- Jefferson
- Richland
- Rock
- Sauk
- Walworth
- Winnebago, Ill. (northern portion)

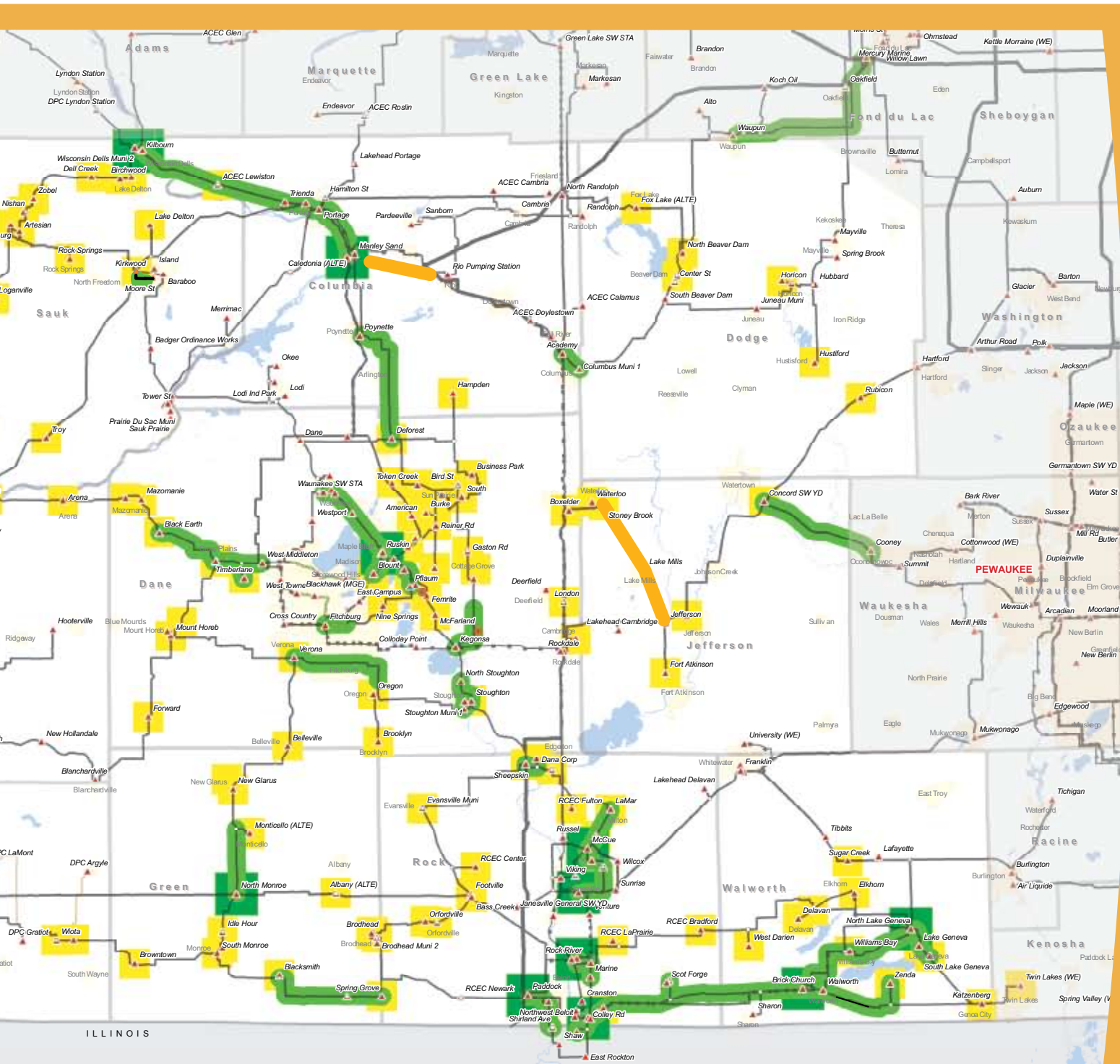


# d North Central Illinois

## Transmission system limitations in Zone 3

In the analysis of Zone 3 for 2007, we identified low voltages and transmission facility overloads. Low voltages are particularly serious in Dane and Green counties. The potential for voltage collapse in the Madison area is emerging and will require significant transmission reinforcements within the next 10 years.

Facility overloads on 138-kV and 69-kV facilities throughout Zone 3 are current or emerging concerns. Electric load growth in Rock and Walworth counties is precipitating the need for reinforcements in those areas in the 2007-2011 timeframe. Load growth in southwestern Wisconsin will necessitate reinforcements to the transmission system in the 2009-2016 timeframe.



# Zone 3 – South Central/Southwest Wisconsin and

## Transmission projects in Zone 3

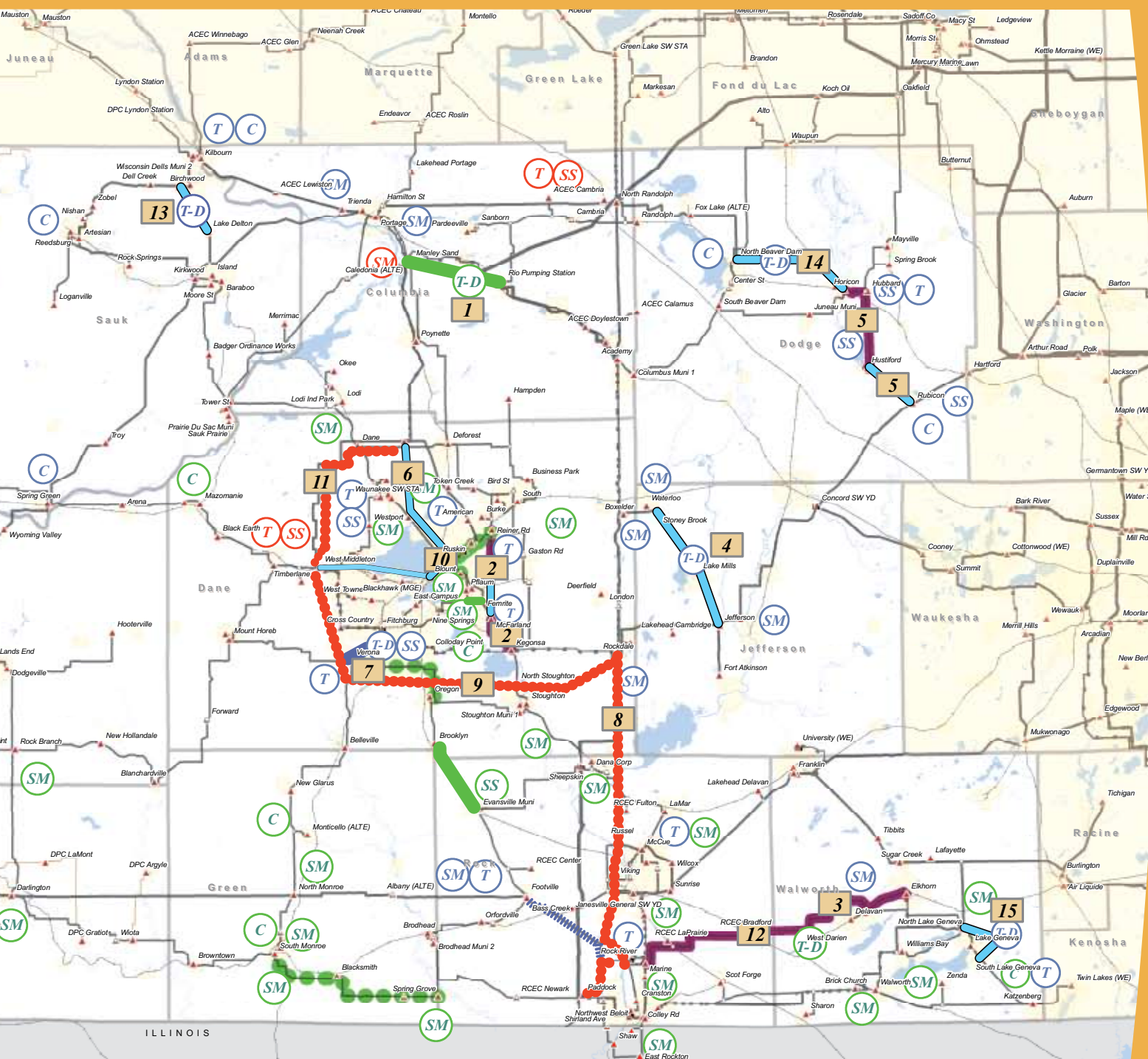
ATC has completed six network projects in Zone 3 since the 2005 Assessment Update, most notably the conversion of the Columbia-North Madison 138-kV line to 345-kV operation.

Keeping up with the rapidly increasing use of the transmission system in Zone 3 will require continued and close coordination with stakeholders. ATC's current plans in Zone 3 include more than 70 projects between 2006 and 2016 to address issues identified. These projects are in various stages of development. The most notable planned, proposed and provisional projects in Zone 3, along with their projected years of completion and the factors driving the need for the projects, are listed below.



	Project description	In-service year	Need driver
	<b>Planned projects</b>		
1	Columbia-Wyocena-Rio 69-kV line	2007	Transmission-distribution interconnection
2	Kegonsa-Sycamore 138-kV line	2007	Addresses low voltages, accommodates transmission service request
3	Southwest Delavan-Bristol 138-kV line (operate at 69 kV)	2007	Transmission-distribution interconnection
4	Jefferson-Lake Mills-Stony Brook 138-kV line	2008	Addresses low voltages and overloaded facilities, accommodates T-D interconnection
	<b>Proposed projects</b>		
5	Rubicon-Hustisford-Horicon 138-kV line	2008	Addresses low voltages
6	North Madison-Huiskamp 138-kV line	2008	Addresses low voltages, averts voltage collapse
7	Oak Ridge-Verona 138-kV line	2009	Improve area voltages and addresses overloads
8	Paddock-Rockdale 345-kV line	2010	Access Initiative
9	Rockdale-West Middleton 345-kV line	2011	Addresses overloads and low voltages, improves transfer capability to Madison area, averts voltage collapse, lowers system losses
10	Huiskamp-Blount 138-kV line	2012	Addresses low voltages, averts voltage collapse
11	North Madison-West Middleton 345-kV line	2016	Averts voltage collapse, addresses low voltages in the Madison area, lowers system losses, improves stability at Columbia Power Plant, improves transfer capability to Madison area
12	Rock River-Bristol-Elkhorn 69-kV to 138-kV conversion	2009	Addresses overloads and low voltages

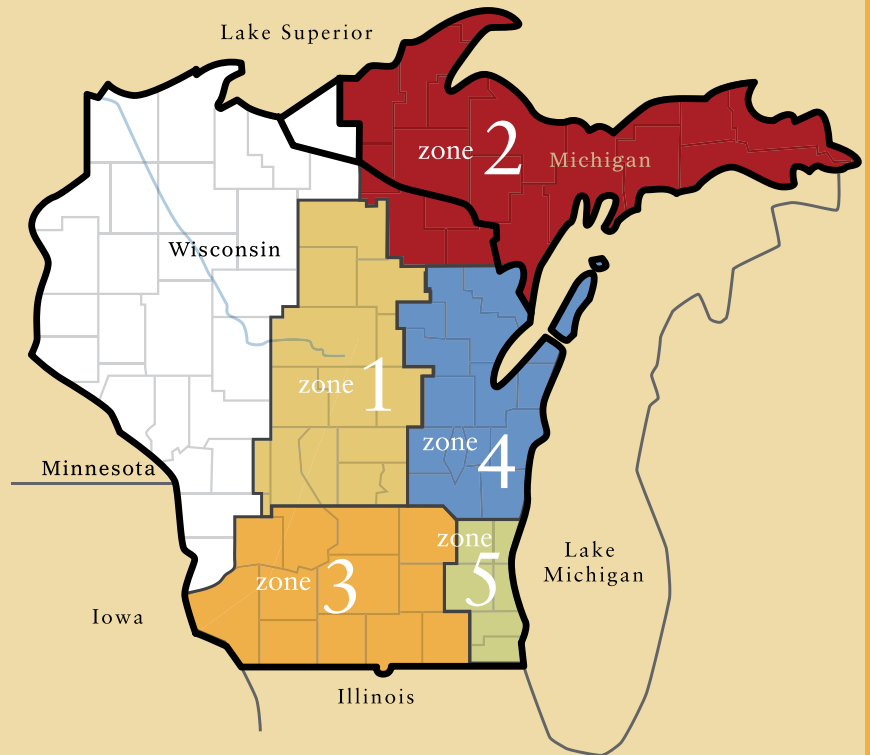
# and North Central Illinois



Project description	In-service year	Need driver
<b>Provisional projects</b>		
<b>13</b> Lake Delton-Birchwood 138-kV line	2013	Addresses overloads and low voltage issues in Reedsburg loop
<b>14</b> Horicon-East Beaver Dam 138-kV line (North Beaver Dam-East Beaver Dam 138-kV line scheduled in service in 2006)	2014	Addresses potential overloads and low voltages
<b>15</b> North Lake Geneva-White River 138-kV line (South Lake Geneva-White River 138-kV line in-service date to be determined)	2012	Addresses potential overloads and low voltages, transmission to distribution interconnection

## ATC at a glance

- Formed in 2001 as the first multi-state, **transmission-only utility**.
- Owner and operator of approximately **8,900 miles of transmission line and 480 substations**.
- Meeting electric needs of approximately **five million people**.
- Transmission facilities in **66 counties** in Wisconsin, Michigan and Illinois.
- **\$1.5 billion** in total assets.
- **Seven offices** in the communities of Cottage Grove, De Pere, Madison, Waukesha and Wausau, Wis.; Kingsford, Mich.; and Washington DC.



## As a public utility, we have duties and responsibilities to:

- Operate the transmission system reliably,
- Assess the ability of the system to adequately meet current and future needs,
- Plan system upgrades to meet those needs in the most efficient, effective and economic ways,
- Construct upgrades in time to meet those needs,
- Maintain the transmission equipment and surroundings to minimize opportunity for failures.



Helping to **keep the lights on,**  
businesses running and communities strong.

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